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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/787,793	06/12/2001	Atsuchi Yatagai	1752-0143P	9670

2292 7590 07/07/2004

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EXAMINER	
NAFF, DAVID M	
ART UNIT	**PAPER NUMBER**
1651	

DATE MAILED: 07/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/787,793	YATAGAI ET AL.	
	Examiner	Art Unit	
	David M. Naff	1651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9 and 15-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9 and 15-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4/28/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *See Continuation Sheet*.

Continuation of Attachment(s) 6). Other: Translations of Overath et al and Heinzel..

DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after allowance or after an Office action under *Ex Parte Quayle*, 25 USPQ 74, 453 O.G. 213 (Comm'r Pat. 1935). Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on 4/28/04 has been entered.

The submission did not amend the claims, and contained an Information Disclosure Statement and petition under 37 CFR 1.313(c)(2) to withdraw the application from issue after payment of the issue fee and being assigned Patent No. 6,734,011 B1 and issue date of 5/11/04.

The petition under 37 CFR 1.313(c)(2) was granted 4/29/04.

Claims examined on the merits are 1-9 and 15-20, which are all claims in the application.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs` of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 4, 6 and 7 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Abdel-Jawad et al (Cement and Concrete Research) or Lennemann (4,428,700) (both listed on form PTO-1449 of 4/28/04).

The claims are drawn to a denitrifying composition containing particles of calcium carbonate dispersed in sulfur by heating and dispersing calcium carbonate particles in melted sulfur and solidifying the dispersion by cooling.

Abdel-Jawad et al disclose (page 167) preparing a sulfur cement by dispersing heated aggregates of limestone (calcium carbonate) in molten sulfur (formed by melting sulfur) in a mold, cooling at room temperature, and demolding. The amount of limestone is 27%.

Lennemann disclose (paragraph bridging cols 2 and 3) the same type of process as disclosed by Abdel-Jawad et al for preparing sulfur cement using an aggregate that can be limestone. The amount of aggregate can be about 50-86% (col 4, line 64).

The claimed composition can be the same as the sulfur cement containing limestone disclosed by Abdel-Jawad et al or Lennemann since the claimed procedure for preparing the composition is the same as disclosed by Abdel-Jawad et al or Lennemann for preparing sulfur cement. The weight ratio range of claim 4 encompasses 30% calcium carbonate which would have been obvious from the 27% used by Abdel-Jawad et al. The 50-86% of aggregate disclosed by Lennemann is within the ratio range of claim 4. The sulfur used by Abdel-Jawad et al and Lennemann appears to be amorphous as in claim 6. If not amorphous, it

would have been obvious to use this form since this is a readily available commercial form of sulfur. The sulfur cement of Abdel-Jawad et al or Lennemann is in a shape as required by claim 7.

Claim Rejections - 35 USC § 103

Claims 1, 3-9 and 15-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Overath et al (DE 3414556) (listed on form PTO-1449 of 4/28/04) (copy of translation enclosed) in view of Kruithof et al or van der Hoek et al (both listed on form PTO-1449 of 6/21/01) taken with Abdel-Jawad et al or Lennemann.

The claims are drawn to a composition as set forth above and to methods of using the composition in methods of decreasing nitrate nitrogen in water or an effluent.

Overath et al disclose removing nitrate from water using a sulfur impregnated porous support which can be activated carbon (page 6, line 2 of translation). The amount of sulfur can be 5-95 wt% (page 6, line 10). The support material can be impregnated with sulfur by mixing sulfur with the support material and heating to 120-3,000^{0}C for 1-40 hours (page 7, lines 3-5 of the translation).

Kruithof et al and van der Hoek et al disclose nitrate removal from water using a sulfur/limestone combination. The limestone maintains an optimal pH and provides inorganic carbon for bacteria. See Kruithof et al (page 208, last sentence of 5th paragraph) and van der Hoek et al (sentence bridging the cols on page 197).

Abdel-Jawad et al and Lennemann are described above.

It would have been obvious to add limestone to the sulfur impregnated in a porous support as disclosed by Overath et al to obtain the function of the limestone to control pH and provide carbon for bacteria as disclosed by Kruithof et al or van der Hoek et al. It would have been further obvious to mix the limestone with molten sulfur and cool to obtain a solid as disclosed by Abdel-Jawad et al or Lennemann since Overath et al disclose heating at 120-3,000°C that will render the sulfur molten after mixing with the support. Selecting a preferred ratio as in claim 4 and parts of components as in claim 5 would have been a matter of selecting preferred conditions using limited routine experimentation within the skill of the art. Adding mineral fibers to the sulfur as in claims 8 and 9 would have been suggested by Lennemann disclosing (col 2, line 56) adding mineral fibers to sulfur that may contain limestone. The methods of decreasing nitrate nitrogen as in claims 15-18 would have been obvious from the methods disclosed by Overath et al and Kruithof et al or van der Hoek et al for removing nitrate. Obtaining the carbon of Overath et al from rice hull as in claim 19 would have been obvious to obtain the carbon from an inexpensive rice hull byproduct of rice processing. Using kieselguhr as the porous material of Overath et al as in claim 20 would have been obvious since kieselguhr is a well known porous material.

Claim Rejections - 35 USC § 103

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 1, 3-9 and 15-20 above, and

further in view of Heinzel (DE 19807406) (listed on form PTO-1449 of 4/28/04) (translation enclosed).

The claim requires the sulfur of the composition of claim 1 to contain a substance possessing cation exchange capacity dispersed in the sulfur.

Heinzel discloses using zeolite as a support for microorganisms when treating waste water. The zeolite additionally has an advantage of selectively exchanging ammonium ions and adsorbing organic molecules (page 4, second full paragraph of translation).

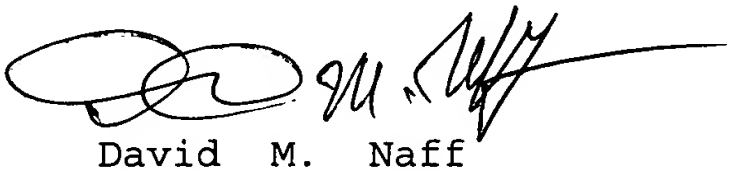
When adding limestone to the sulfur of Overath et al as set forth above, it would have been additionally obvious to add zeolite to obtain its function to selectively exchange ammonium ions and adsorb organic molecules as disclosed by Heinzel. Zeolite has cation exchange capacity.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David M. Naff whose telephone number is 571-272-0920. The examiner can normally be reached on Monday-Friday 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Wityshyn can be reached on 571-272-0926. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



David M. Naff
Primary Examiner
Art Unit 1651

DMN
7/2//04